

RETI Phase 2A Final Report Update

Effect of Revised Demand Forecast on RETI Net Short

DISCUSSION DRAFT

Summary

RETI transmission planning utilizes a parameter called the “net short”, an estimate of the additional renewable energy needed to satisfy a 33% renewable portfolio standard (RPS) which may require significant additions to the state’s electric transmission system.¹ The net short depends, among other factors, on projected electricity consumption in the year 2020 and the amount of renewable energy currently being generated. Estimates of these factors have changed since the last update of the net short. This report describes the effect of those changes and provides the current best estimate of the net short.

The California Energy Commission (CEC) forecasts future electricity demand as part of the biennial Integrated Energy Policy Report (IEPR.) The 2009 IEPR has not yet been adopted by the Commission but the staff’s recently revised draft demand forecast was presented to the IEPR Committee on September 21.² In the revised forecast, future electricity consumption is projected to be significantly lower than estimated in the 2007 IEPR on which previous net short estimates relied³, primarily due to the impact of the current recession. 2020 consumption is currently estimated to be 6.3% lower than IEPR 2007 estimates, lowering the net short estimate significantly.

In addition, estimates of existing renewable energy generation have been updated using the most recent data, further reducing the net short estimate. The current estimated net short is 50,862 GWh, compared to the previous RETI estimate of 59,710 GWh, a substantial reduction.

This update report discusses the current net short calculation, uncertainties, future updates that will likely be necessary, and some implications of the new net short estimate on transmission planning.

¹ The renewable net short was estimated in RETI Phase 1B to be 67,536 GWh. The RETI Stakeholder Steering Committee revised this downward in February, 2009 to 59,710 GWh. The document explaining this revision is available at: <http://www.energy.ca.gov/reti/documents/index.html>.

² The draft demand forecast report and associated data is available at: http://www.energy.ca.gov/2009_energypolicy/index.html.

³ The demand forecast in the 2007 IEPR extended through 2018 and was further extended to 2020 for RETI by CEC staff.

CEC Demand Forecast and Net Short Revisions

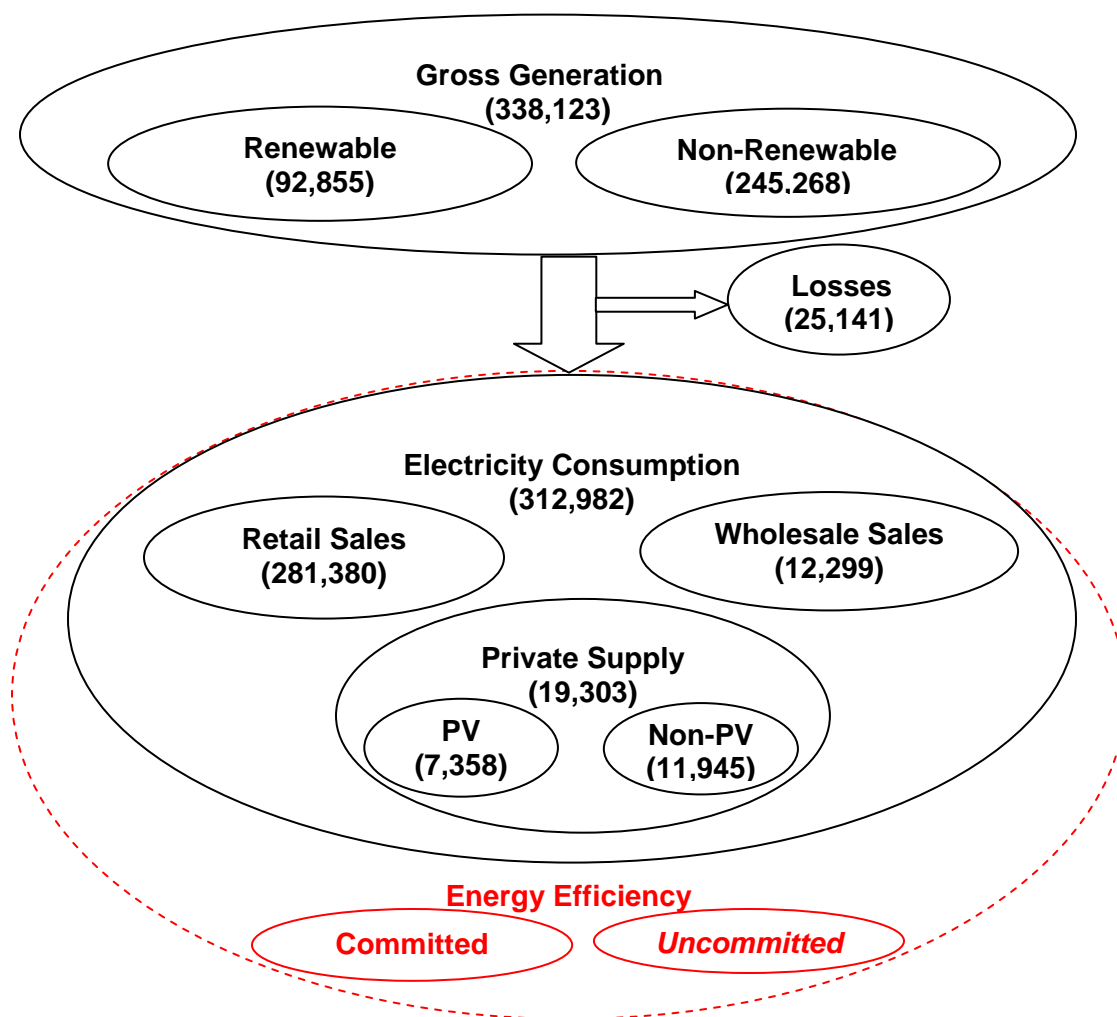


Figure 1 – California Electric Generation and Consumption Diagram, 2020 (GWh)

The factors on which the net short calculation depends are shown in Figure 1 using CEC terminology.⁴ Projected energy values are shown in parentheses in gigawatt-hours. The dashed red oval indicates that consumption would be considerably larger in the absence of savings from California's energy efficiency programs. Estimated future savings from currently approved programs ("committed" savings) have been considered in the draft CEC demand forecast. "Uncommitted" savings from expected but unapproved future programs have not yet been accounted for in the demand forecast but will further reduce projected consumption, as discussed below.⁵

⁴ Private supply is otherwise known as "self-generation", energy produced on-site for use by individual consumers. Private supply is included in consumption but not in sales or in gross generation. Gross generation minus private supply is referred to as "net energy for load".

⁵ For a discussion of committed and uncommitted energy efficiency savings, refer to the CEC document cited in footnote 2.

The 33% RPS target for renewable generation, as currently interpreted, is 33% of retail sales, or:

$$\text{RPS Renewable Generation} = 33\% \times \text{Retail Sales} = 33\% \times \{\text{Total Consumption} - \text{Wholesale Sales} - \text{Private Supply}\}$$

The net short, i.e., the amount of renewable energy which may need expanded transmission capacity, is:

$$\text{Net Short} = \text{RPS Renewable Generation} - \text{Existing Renewable Generation} - \text{Miscellaneous Other Renewable}^6$$

Data used in this update to calculate the net short are shown in Table 1 and discussed below. Table 1 also compares current consumption and generation values as determined by the CEC to those used by RETI in its February 2009 net short revision.

RETI Net Short Update November 2009 (GWh)		
Parameter	Current Update	Feb 09 Update
Total Consumption	312,982	334,169
Wholesale Sales	12,299	12,299
Private Supply	19,303	19,896
Retail Sales	281,380	301,974
33% RPS Renewable Generation	92,855	99,651
Existing Renewable Generation	39,324	36,807
Miscellaneous Other Renewable	2,670	3,134
Net Short	50,862	59,710
Renewable Energy Added	53,532	62,844

Table 1 – Comparison of Net Short Factors from Previous Update

Discussion

Total Consumption – The 2009 CEC demand forecast markedly reduces expected consumption in 2020 compared to the 2007 forecast used in the earlier RETI update.⁷ Total consumption in 2020 is now projected to be about 21,000 GWh lower than previously. This reduction primarily reflects the impact of the current recession on electricity use and expected additional reductions from utility energy efficiency programs.

Wholesale Sales represent consumption by the Western Area Power Administration, the Metropolitan Water District and the Department of Water Resources. The CEC has not yet revised its forecast of wholesale sales.

Private Supply includes both photovoltaic (PV) generation by individual consumers and non-PV self generation. As described in the February 2009 Update, RETI uses a different projected value for PV private supply than the CEC. In the 2009 demand forecast the CEC has increased its PV estimate substantially, but it is still smaller than the RETI value due to remaining differences in methodology. The PV value used here is the same as in the previous RETI update. The CEC has lowered its estimate of non-PV private supply somewhat.

Retail Sales equal total consumption minus wholesale sales minus private supply.

33% RPS Renewable Generation equals 33% of retail sales.

⁶ Miscellaneous other renewables are various smaller dispersed resources, including landfill gas, biogas, and wave and tidal energy not likely to need transmission upgrades, as described in the RETI Phase 1B Report.

⁷ An earlier 2009 draft forecast projected an even larger drop in consumption. See also footnote 3.

Existing Renewable – This category includes renewable generation reported in the CEC 2008 Net System Power Report together with renewable generation added and expected to be added by the end of 2009. The values indicate that by the end of this year an additional 2,500 GWh of renewable generation will have been placed in service since 2007.⁸

Miscellaneous Other Renewable – The marine energy in this category included in the previous update now appears unlikely to come on line before 2020 and has been omitted.

Net Short is calculated using the formula described above.

Renewable Energy Added is the sum of the net short and miscellaneous other renewables which would be needed in addition to existing renewable energy to achieve a 33% RPS goal.

Displaced Non-Renewable Energy

Consumption in 2020 is currently projected to be 312,982 GWh compared to the estimated 2009 value of 280,644, an increase of 32,338 GWh. If the 33% RPS is achieved in 2020, the renewable energy added would be 53,532, GWh. In other words, the additional renewable energy would be more than enough to satisfy the projected increase in consumption and therefore would displace some existing generation. The amount of non-renewable energy displaced, 21,194 GWh, presumably would be from fossil-fueled generation in order to reduce emissions of carbon dioxide, the major greenhouse gas.

Transmission planners must consider not only additional transmission capacity which may be needed to accommodate renewable energy, as reflected in the net short, but also existing transmission capacity that may become available when non-renewable energy is displaced. For example, if the energy to be displaced is currently being imported from out of state, capacity in California transmission lines now carrying that imported energy to California load centers may become available to carry renewable energy. The net short may therefore overstate the transmission capacity needed for the RPS goal.

As noted in RETI reports, however, transmission capacity in excess of the net short is likely to be needed to accommodate uncertainties in the location of renewable energy development and to enable competition between developments in different areas. The amount of new transmission capacity needed for the 33% goal will be determined in detailed planning processes now underway.

Uncertainties, Efficiency Savings, and Future Revisions

As described in the CEC document, demand forecasts rely on several assumptions and are necessarily uncertain. The likelihood that the future will correspond exactly to the forecast is nil. Decision makers relying on these forecasts must take this uncertainty into account and plan conservatively.

The 2009 demand forecast lowered 2020 consumption estimates dramatically based on an economic scenario which also is uncertain. To evaluate this uncertainty, the CEC considered more optimistic and more pessimistic scenarios in which the rate of economic recovery was faster and slower than the rate of recovery used in the demand forecast. In these alternative economic scenarios, consumption increased or decreased about 2% respectively (about \pm 7,000 GWh) from the value used above.⁹ Under these alternative scenarios, the net short estimate would increase or decrease by about 4% respectively (about \pm 2,000 GWh.)

The recent CEC demand forecast includes expected reductions in the demand for electricity due to planned utility energy efficiency programs. Investor owned utility (IOU)

⁸ Estimated existing renewable generation in the previous update was based on the 2007 Net System Power report.

⁹ CEC-200-2009-012-SF.pdf, page 22.

programs for 2010 – 2012 have recently been announced and are reflected in the demand forecast as “committed” energy savings. Publicly owned utility (POU) programs through 2009 are also included. It is highly likely that utility efficiency programs will continue when the current programs are completed, but future “uncommitted” energy savings expected to occur by 2020 have not been accounted for in the current CEC demand forecast.

The CPUC has announced its intention of using an estimate of the amount of IOU uncommitted energy savings in its long term procurement proceeding (LTPP)¹⁰. The CEC is scheduled to provide such an estimate around the end of this year. Since the growth in consumption estimated *without* uncommitted savings is now only 32,338 GWh, *inclusion* of uncommitted savings will reduce estimated growth in consumption, perhaps significantly. When these additional savings are included, the net short estimate will also decline and the amount of non-renewable energy displaced will increase.

RETI will revisit the net short estimate when the uncommitted savings estimates have been completed and consider the implications of further reductions in expected consumption for transmission planning.

Conclusions

The economic recession has reduced current electricity consumption markedly compared to earlier forecasts. As a consequence, forecast consumption in 2020 has been reduced substantially, depending primarily on the rate of economic recovery.

Together with larger than expected recent additions to existing renewable generation in the state's portfolio, the amount of additional renewable generation expected to require transmission upgrades (the net short) has decreased by about 9,000 GWh (-15%). Depending on the economic recovery, this value may change by $\pm 2,000$ GWh or so.

The consumption forecast on which the current net short estimate is based did not account for uncommitted efficiency savings from future utility programs. Further downward revisions are expected when uncommitted energy efficiency savings are incorporated into the forecast. The impact of these savings on total consumption will be estimated in the next few months, and the net short will be reevaluated at that time.

With less growth in consumption expected, a smaller fraction of renewable energy additions will be required to meet that growth, and a larger fraction will displace non-renewable energy. The implications of these changes must be considered in detailed transmission planning processes.

¹⁰ Energy Division Straw proposal on LTPP Planning Standards, R.08-02-007, Phase 1, Page 90. Available at <http://docs.cpuc.ca.gov/published/Graphics/103215.PDF>.